(2) Training in a flight simulator that meets the requirements of §141.41(a) of this part may be credited for a maximum of 50 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less.

(3) Training in a flight training device that meets the requirements of §141.41(b) of this part may be credited for a maximum of 40 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less.

(4) Training in flight simulators or flight training devices described in paragraphs (b)(2) and (b)(3) of this section, if used in combination, may be credited for a maximum of 50 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less. However, credit for training in a flight training device that meets the requirements of §141.41(b) cannot exceed the limitation provided for in paragraph (b)(3) of this section.

(c) Each approved course must include the following flight training—

(1) *For an instrument airplane course:* Instrument training time from a certificated flight instructor with an instrument rating on the approved areas of operation in paragraph (d) of this section including at least one cross-country flight that—

(i) Is in the category and class of airplane that the course is approved for, and is performed under IFR;

(ii) Is a distance of at least 250 nautical miles along airways or ATC-directed routing with one segment of the flight consisting of at least a straight-line distance of 100 nautical miles between airports;

(iii) Involves an instrument approach at each airport; and

(iv) Involves three different kinds of approaches with the use of navigation systems.

(2) *For an instrument helicopter course:* Instrument training time from a certificated flight instructor with an instrument rating on the approved areas of operation in paragraph (d) of this section including at least one cross-country flight that—

(i) Is in a helicopter and is performed under IFR;

(ii) Is a distance of at least 100 nautical miles along airways or ATC-directed routing with one segment of the flight consisting of at least a straight-line distance of 50 nautical miles between airports;

(iii) Involves an instrument approach at each airport; and

(iv) Involves three different kinds of approaches with the use of navigation systems.

(3) *For an instrument powered-lift course:* Instrument training time from a certificated flight instructor with an instrument rating on the approved areas of operation in paragraph (d) of this section including at least one cross-country flight that—

(i) Is in a powered-lift and is performed under IFR;

(ii) Is a distance of at least 250 nautical miles along airways or ATC-directed routing with one segment of the flight consisting of at least a straight-line distance of 100 nautical miles between airports;

(iii) Involves an instrument approach at each airport; and

(iv) Involves three different kinds of approaches with the use of navigation systems.

(d) Each approved course must include the flight training on the approved areas of operation listed in this paragraph appropriate to the instrument aircraft category and class rating for which the course applies:

(1) Preflight preparation;

(2) Preflight procedures;

(3) Air traffic control clearances and procedures;

(4) Flight by reference to instruments;

(5) Navigation systems;

(6) Instrument approach procedures;

(7) Emergency operations; and

(8) Postflight procedures.

5. *Stage checks and end-of-course tests.* Each student enrolled in an instrument rating course must satisfactorily accomplish the stage checks and end-of-course tests, in accordance with the school's approved training course, consisting of the approved areas of operation listed in paragraph (d) of section No. 4 of this appendix that are appropriate to the aircraft category and class rating for which the course applies.

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APPENDIX D TO PART 141—COMMERCIAL PILOT CERTIFICATION COURSE

1. *Applicability.* This appendix prescribes the minimum curriculum for a commercial pilot certification course required under this part, for the following ratings:

(a) Airplane single-engine.

(b) Airplane multiengine.

(c) Rotorcraft helicopter.

(d) Rotorcraft gyroplane.

(e) Powered-lift.

(f) Glider.

(g) Lighter-than-air airship.

(h) Lighter-than-air balloon.

2. *Eligibility for enrollment.* A person must hold the following prior to enrolling in the flight portion of the commercial pilot certification course:

(a) At least a private pilot certificate; and

(b) If the course is for a rating in an airplane or a powered-lift category, then the person must:

(1) Hold an instrument rating in the aircraft that is appropriate to the aircraft category rating for which the course applies; or

(2) Be concurrently enrolled in an instrument rating course that is appropriate to the

aircraft category rating for which the course applies, and pass the required instrument rating practical test prior to completing the commercial pilot certification course.

3. *Aeronautical knowledge training.* (a) Each approved course must include at least the following ground training on the aeronautical knowledge areas listed in paragraph (b) of this section, appropriate to the aircraft category and class rating for which the course applies:

(1) 35 hours of training if the course is for an airplane category rating or a powered-lift category rating.

(2) 65 hours of training if the course is for a lighter-than-air category with an airship class rating.

(3) 30 hours of training if the course is for a rotocraft category rating.

(4) 20 hours of training if the course is for a glider category rating.

(5) 20 hours of training if the course is for lighter-than-air category with a balloon class rating.

(b) Ground training must include the following aeronautical knowledge areas:

(1) Federal Aviation Regulations that apply to commercial pilot privileges, limitations, and flight operations;

(2) Accident reporting requirements of the National Transportation Safety Board;

(3) Basic aerodynamics and the principles of flight;

(4) Meteorology, to include recognition of critical weather situations, windshear recognition and avoidance, and the use of aeronautical weather reports and forecasts;

(5) Safe and efficient operation of aircraft;

(6) Weight and balance computations;

(7) Use of performance charts;

(8) Significance and effects of exceeding aircraft performance limitations;

(9) Use of aeronautical charts and a magnetic compass for pilotage and dead reckoning;

(10) Use of air navigation facilities;

(11) Aeronautical decision making and judgment;

(12) Principles and functions of aircraft systems;

(13) Maneuvers, procedures, and emergency operations appropriate to the aircraft;

(14) Night and high-altitude operations;

(15) Descriptions of and procedures for operating within the National Airspace System; and

(16) Procedures for flight and ground training for lighter-than-air ratings.

4. *Flight training.* (a) Each approved course must include at least the following flight training, as provided in this section and section No. 5 of this appendix, on the approved areas of operation listed in paragraph (d) of this section that are appropriate to the aircraft category and class rating for which the course applies:

(1) 120 hours of training if the course is for an airplane or powered-lift rating.

(2) 155 hours of training if the course is for an airship rating.

(3) 115 hours of training if the course is for a rotocraft rating.

(4) 6 hours of training if the course is for a glider rating.

(5) 10 hours of training and 8 training flights if the course is for a balloon rating.

(b) Each approved course must include at least the following flight training:

(1) *For an airplane single-engine course:* 55 hours of flight training from a certificated flight instructor on the approved areas of operation listed in paragraph (d)(1) of this section that includes at least—

(i) 5 hours of instrument training in a single-engine airplane;

(ii) 10 hours of training in a single-engine airplane that has retractable landing gear, flaps, and a controllable pitch propeller, or is turbine-powered;

(iii) One cross-country flight in a single-engine airplane of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in day VFR conditions;

(iv) One cross-country flight in a single-engine airplane of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(v) 3 hours in a single-engine airplane in preparation for the practical test within 60 days preceding the date of the test.

(2) *For an airplane multiengine course:* 55 hours of flight training from a certificated flight instructor on the approved areas of operation listed in paragraph (d)(2) of this section that includes at least—

(i) 5 hours of instrument training in a multiengine airplane;

(ii) 10 hours of training in a multiengine airplane that has retractable landing gear, flaps, and a controllable pitch propeller, or is turbine-powered;

(iii) One cross-country flight in a multiengine airplane of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in day VFR conditions;

(iv) One cross-country flight in a multiengine airplane of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(v) 3 hours in a multiengine airplane in preparation for the practical test within 60 days preceding the date of the test.

(3) *For a rotorcraft helicopter course:* 30 hours of flight training from a certificated flight

instructor on the approved areas of operation listed in paragraph (d)(3) of this section that includes at least—

(i) 5 hours of instrument training;

(ii) One cross-country flight in a helicopter of at least a 2-hour duration, a total straight-line distance of more than 50 nautical miles from the original point of departure and occurring in day VFR conditions;

(iii) One cross-country flight in a helicopter of at least a 2-hour duration, a total straight-line distance of more than 50 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(iv) 3 hours in a helicopter in preparation for the practical test within 60 days preceding the date of the test.

(4) *For a rotorcraft gyroplane course:* 30 hours of flight training from a certificated flight instructor on the approved areas of operation listed in paragraph (d)(4) of this section that includes at least—

(i) 5 hours of instrument training;

(ii) One cross-country flight in a gyroplane of at least a 2-hour duration, a total straight-line distance of more than 50 nautical miles from the original point of departure, and occurring in day VFR conditions;

(iii) One cross-country flight in a gyroplane of at least a 2-hour duration, a total straight-line distance of more than 50 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(iv) 3 hours in a gyroplane in preparation for the practical test within 60 days preceding the date of the test.

(5) *For a powered-lift course:* 55 hours of flight training from a certificated flight instructor on the approved areas of operation listed in paragraph (d)(5) of this section that includes at least—

(i) 5 hours of instrument training in a powered-lift;

(ii) One cross-country flight in a powered-lift of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in day VFR conditions;

(iii) One cross-country flight in a powered-lift of at least a 2-hour duration, a total straight-line distance of more than 100 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(iv) 3 hours in a powered-lift in preparation for the practical test within 60 days preceding the date of the test.

(6) *For a glider course:* 4 hours of flight training from a certificated flight instructor on the approved areas of operation in paragraph (d)(6) of this section, that includes at least—

(i) Five training flights in a glider with a certificated flight instructor on the launch/tow procedures approved for the course and on the appropriate approved areas of operation listed in paragraph (d)(6) of this section; and

(ii) Three training flights in a glider with a certificated flight instructor in preparation for the practical test within 60 days preceding the date of the test.

(7) *For a lighter-than-air airship course:* 55 hours of flight training in airships from a commercial pilot with an airship rating on the approved areas of operation in paragraph (d)(7) of this section that includes at least—

(i) 3 hours of instrument training in an airship;

(ii) One cross-country flight in an airship of at least a 1-hour duration, a total straight-line distance of more than 25 nautical miles from the original point of departure, and occurring in day VFR conditions; and

(iii) One cross-country flight in an airship of at least a 1-hour duration, a total straight-line distance of more than 25 nautical miles from the original point of departure, and occurring in night VFR conditions; and

(iv) 3 hours in an airship, in preparation for the practical test within 60 days preceding the date of the test.

(8) *For a lighter-than-air balloon course:* Flight training from a commercial pilot with a balloon rating on the approved areas of operation in paragraph (d)(8) of this section that includes at least—

(i) If the course involves training in a gas balloon:

(A) Two flights of 1 hour each;

(B) One flight involving a controlled ascent to at least 5,000 feet above the launch site; and

(C) Two flights in preparation for the practical test within 60 days preceding the date of the test.

(ii) If the course involves training in a balloon with an airborne heater:

(A) Two flights of 30 minutes each;

(B) One flight involving a controlled ascent to at least 3,000 feet above the launch site; and

(C) Two flights in preparation for the practical test within 60 days preceding the date of the test.

(c) For the use of flight simulators or flight training devices:

(1) The course may include training in a flight simulator or flight training device, provided it is representative of the aircraft for which the course is approved, meets the requirements of this paragraph, and is given by an authorized instructor.

(2) Training in a flight simulator that meets the requirements of §141.41(a) of this part may be credited for a maximum of 30 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less.

(3) Training in a flight training device that meets the requirements of §141.41(b) of this part may be credited for a maximum of 20 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less.

(4) Training in the flight training devices described in paragraphs (c)(2) and (c)(3) of this section, if used in combination, may be credited for a maximum of 30 percent of the total flight training hour requirements of the approved course, or of this section, whichever is less. However, credit for training in a flight training device that meets the requirements of §141.41(b) cannot exceed the limitation provided for in paragraph (c)(3) of this section.

(d) Each approved course must include the flight training on the approved areas of operation listed in this paragraph that are appropriate to the aircraft category and class rating—

(1) *For an airplane single-engine course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport and seaplane base operations;
(iv) Takeoffs, landings, and go-arounds;
(v) Performance maneuvers;
(vi) Navigation;
(vii) Slow flight and stalls;
(viii) Emergency operations;
(ix) High-altitude operations; and
(x) Postflight procedures.

(2) *For an airplane multiengine course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport and seaplane base operations;
(iv) Takeoffs, landings, and go-arounds;
(v) Performance maneuvers;
(vi) Navigation;
(vii) Slow flight and stalls;
(viii) Emergency operations;
(ix) Multiengine operations;
(x) High-altitude operations; and
(xi) Postflight procedures.

(3) *For a rotorcraft helicopter course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport and heliport operations;
(iv) Hovering maneuvers;
(v) Takeoffs, landings, and go-arounds;
(vi) Performance maneuvers;
(vii) Navigation;
(viii) Emergency operations;
(ix) Special operations; and
(x) Postflight procedures.

(4) *For a rotorcraft gyroplane course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport operations;
(iv) Takeoffs, landings, and go-arounds;
(v) Performance maneuvers;
(vi) Navigation;
(vii) Flight at slow airspeeds;
(viii) Emergency operations; and
(ix) Postflight procedures.

(5) *For a powered-lift course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport and heliport operations;
(iv) Hovering maneuvers;
(v) Takeoffs, landings, and go-arounds;
(vi) Performance maneuvers;
(vii) Navigation;
(viii) Slow flight and stalls;
(ix) Emergency operations;
(x) High altitude operations;
(xi) Special operations; and
(xii) Postflight procedures.

(6) *For a glider course:* (i) Preflight preparation;
(ii) Preflight procedures;
(iii) Airport and gliderport operations;
(iv) Launches/tows, as appropriate, and landings;
(v) Performance speeds;
(vi) Soaring techniques;
(vii) Performance maneuvers;
(viii) Navigation;
(ix) Slow flight and stalls;
(x) Emergency operations; and
(xi) Postflight procedures.

(7) *For a lighter-than-air airship course:* (i) Fundamentals of instructing;
(ii) Technical subjects;
(iii) Preflight preparation;
(iv) Preflight lessons on a maneuver to be performed in flight;
(v) Preflight procedures;
(vi) Airport operations;
(vii) Takeoffs, landings, and go-arounds;
(viii) Performance maneuvers;
(ix) Navigation;
(x) Emergency operations; and
(xi) Postflight procedures.

(8) *For a lighter-than-air balloon course:* (i) Fundamentals of instructing;
(ii) Technical subjects;
(iii) Preflight preparation;
(iv) Preflight lesson on a maneuver to be performed in flight;
(v) Preflight procedures;
(vi) Airport operations;
(vii) Launches and landings;
(viii) Performance maneuvers;
(ix) Navigation;
(x) Emergency operations; and
(xi) Postflight procedures.

5. *Solo training.* Each approved course must include at least the following solo flight training:

(a) *For an airplane single-engine course:* 10 hours of solo flight training in a single-engine airplane on the approved areas of operation in paragraph (d)(1) of section No. 4 of this appendix that includes at least—

(1) One cross-country flight, if the training is being performed in the State of Hawaii, with landings at a minimum of three points, and one of the segments consisting of a straight-line distance of at least 150 nautical miles;

(2) One cross-country flight, if the training is being performed in a State other than Hawaii, with landings at a minimum of three points, and one segment of the flight consisting of a straight-line distance of at least 250 nautical miles; and

(3) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower.

(b) *For an airplane multiengine course:* 10 hours of flight training in a multiengine airplane performing the duties of pilot in command while under the supervision of a certificated flight instructor. The training must consist of the approved areas of operation in paragraph (d)(2) of section No. 4 of this appendix, and include at least—

(1) One cross-country flight, if the training is being performed in the State of Hawaii, with landings at a minimum of three points, and one of the segments consisting of a straight-line distance of at least 150 nautical miles;

(2) One cross-country flight, if the training is being performed in a State other than Hawaii, with landings at a minimum of three points and one segment of the flight consisting of straight-line distance of at least 250 nautical miles; and

(3) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower.

(c) *For a rotorcraft helicopter course:* 10 hours of solo flight training in a helicopter on the approved areas of operation in paragraph (d)(3) of section No. 4 of this appendix that includes at least—

(1) One cross-country flight with landings at a minimum of three points and one segment of the flight consisting of a straight-line distance of at least 50 nautical miles from the original point of departure; and

(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower.

(d) *For a rotorcraft-gyroplane course:* 10 hours of solo flight training in a gyroplane on the approved areas of operation in paragraph (d)(4) of section No. 4 of this appendix that includes at least—

(1) One cross-country flight with landings at a minimum of three points, and one segment of the flight consisting of a straight-line distance of at least 50 nautical miles from the original point of departure; and

(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower.

(e) *For a powered-lift course:* 10 hours of solo flight training in a powered-lift on the approved areas of operation in paragraph (d)(5) of section No. 4 of this appendix that includes at least—

(1) One cross-country flight, if the training is being performed in the State of Hawaii, with landings at a minimum of three points, and one segment of the flight consisting of a straight-line distance of at least 150 nautical miles;

(2) One cross-country flight, if the training is being performed in a State other than Hawaii, with landings at a minimum of three points, and one segment of the flight consisting of a straight-line distance of at least 250 nautical miles; and

(3) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower.

(f) *For a glider course:* 5 solo flights in a glider on the approved areas of operation in paragraph (d)(6) of section No. 4 of this appendix.

(g) *For a lighter-than-air airship course:* 10 hours of flight training in an airship performing the duties of pilot in command while under the supervision of a commercial pilot with an airship rating. The training must consist of the approved areas of operation in paragraph (d)(7) of section No. 4 of this appendix and include at least—

(1) One cross-country flight with landings at a minimum of three points, and one segment of the flight consisting of a straight-line distance of at least 25 nautical miles from the original point of departure; and

(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight with a traffic pattern).

(h) *For a lighter-than-air balloon course:* Two solo flights if the course is for a hot air balloon rating, or, if the course is for a gas balloon rating, at least two flights in a gas balloon, while performing the duties of pilot in command under the supervision of a commercial pilot with a balloon rating. The training shall consist of the approved areas of operation in paragraph (d)(8) of section No. 4 of this appendix, in the kind of balloon for which the course applies.

6. *Stage checks and end-of-course tests.* (a) Each student enrolled in a commercial pilot course must satisfactorily accomplish the stage checks and end-of-course tests, in accordance with the school's approved training course, consisting of the approved areas of operation listed in paragraph (d) of section No. 4 of this appendix that are appropriate to aircraft category and class rating for which the course applies.

(b) Each student must demonstrate satisfactory proficiency prior to receiving an endorsement to operate an aircraft in solo flight.

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